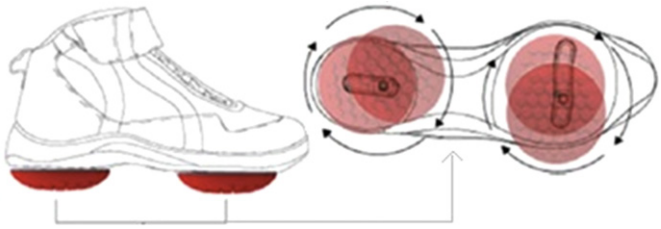

Figure 1: COP manipulation was accomplished using a platform in the form of a shoe in which 2 adjustable convex-shaped biomechanical elements are attached to the feet by means of a shoe sole specially designed with 2 mounting rails. One element is located under the hindfoot and the other under the forefoot, enabling continuous positioning of each element in multiple planes.

Results: Peak one of stance phase external adduction moment was not significant, however adduction angle at the time of peak moment decreased 115% (p=0.008) from L-COP to M-COP. In addition a significant correlation was found between peak one of the adduction moment and the associated adduction/abduction angle (p=0.005, r=0.81). Peak stance phase adduction angle decreased 106% (p=0.012) from L-COP to M-COP (Table 1).

Table 1
Mean(SD) of coronal-plane gait kinematics [o] for L-COP and M-COP.

	L-COP	M-COP
Adduction/Abduction Angle@ Pk 1 Adduction Moment	3.62(3.23)	-0.56(10.78)
Peak Adduction Angle	3.88(3.13)	-0.22(10.55)

Conclusions: In accordance with our hypothesis, coronal COP manipulation significantly altered gait parameters associated with the hip. The results may have clinical implications for hip OA. Hip OA patients may walk with decreased external adduction moment, which may reduce load on the joint. In addition they may shift their center of mass over the affected joint in an effort to compensate for weak abductor muscles, better support the load, and avoid pain. These gait compensations may be implemented at a cost of an asymmetric gait that is detrimental to other joints of the trunk and lower limbs. A decrease in adduction angle was observed with a medial COP and was significantly correlated with decrease in peak one of the adduction moment. Thus, it is possible that a medial COP may provoke a more normal gait by supporting the patient during gait, providing more stability, and reducing pain. In later stages of rehabilitation, it may be beneficial to adopt a lateral COP which may provoke gait that more closely resembles gait of healthy subjects by increasing gait parameters that are decreased due to pathology. This remains to be shown in hip OA patients.

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A NEW NON-INVASIVE BIOMECHANICAL THERAPY FOR KNEE OSTEOARTHRITIS IMPROVES CLINICAL SYMPTOMS AND GAIT PATTERNS

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Purpose: The management of knee osteoarthritis (OA) focuses on reducing the levels of pain and disability. Recently, a novel biomechanical device and treatment methodology (AposTherapy) was shown to reduce knee adduction moment while simultaneously challenging the neuromuscular control system through perturbation. The purpose of the study was to investigate the changes in gait patterns and clinical measurements following treatment with a novel biomechanical device on patients with knee OA.

Methods: 745 patients with bilateral knee OA were analyzed. Patients completed a gait test, Western Ontario and McMaster Osteoarthritis Index (WOMAC) questionnaire and SF-36 Health Survey at baseline and after 12 weeks. The biomechanical device was individually calibrated to each patient. Shifting the center of pressure, through changes in the location of the biomechanical elements causes realignment and reduction in knee adduction moment.. Furthermore the configuration of the biomechanical element allows training under controlled perturbation.

Results: A significant decrease was found in WOMAC pain (28.6%) and WOMAC function (25.2%) following three months of therapy ($p<0.001$). A significant increase was found in the patients' physical quality of life (17.8%) and mental quality of life (11.0%) ($p<0.001$). Gait velocity, cadence step length, stance phase and single limb support phase improved significantly following three months of therapy (7.6%, 4.0%, 3.7% and 1.6%, respectively).

Conclusions: Our results suggest an overall improvement in the gait patterns, level of pain, function and quality of life of patients with knee OA following three months of AposTherapy.

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A NON-INVASIVE TREATMENT (APOSTHERAPY) ACCELERATES THE REHABILITATION TIME OF PATIENTS FOLLOWING TOTAL HIP ARTHROPLASTY. A PROSPECTIVE STUDY

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Purpose:Patients following total hip arthroplasty often do not restore normal gait patterns not do they return to normal levels of pain, function and quality of life. The purpose of the current study was to examine the effect of a new biomechanical rehabilitation therapy on the clinical measurements, gait patterns and gait symmetry of patients with total hip arthroplasty

Methods: Nineteen patients who were an average of 3 months post total hip arthroplasty were enrolled to the study. Patients underwent a computerized gait analysis and a time up and go test. Patients were also asked to complete the Western Ontario and McMaster Universities osteoarthritis index and the SF-36 health survey. Patients then began therapy with a non-invasive biomechanical device coupled with a treatment methodology (AposTherapy) that allows patients to exercise under reduced loads and promotes perturbations throughout the step cycle. Follow-up examinations were conducted after 4, 12 and 26 weeks of therapy.

Results: After 26 weeks of therapy a significant improvement was seen in most gait parameters, including velocity (50.3%), involved step length (22.9%) and involved single limb support (16.5%). A significant improvement was also found in the self-evaluation questionnaires, including a significant reduction in pain (85.4%) and improvement in function (81.1%) and quality of life (52.1%).

Conclusions: Based on the results of this study, the application of such a therapy should be considered in the rehabilitation of patients following total hip arthroplasty.

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RELATIONSHIPS BETWEEN DEGENERATIONS OF ANTERIOR CRUCIATE LIGAMENT AND OSTEOARTHRITIS

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Purpose: To find out the relationships between the degenerations of anterior cruciate ligament (ACL) and cartilage of femur condyle.

Methods: Test 1: Immunohistochemical assay of asporin in the ACL of aged patients with knee osteoarthritis (OA) and young people without knee disease in Chinese Han population. Test 2: Measurement of varus angles of knees in 15 patients with ACL injury when they were taking a weight-bearing positions radiograph of the entire lower extremity. Test 3: Measurement of telomere lengths of medial femoral condyle, lateral femoral condyle and ACL by southern blot in the suffered knee of 6 knee osteoarthritis patients.

Results: Immunohistochemical studies of ACL revealed that aged patients with knee osteoarthritis showed higher expression levels of asporin than young people without knee disease. In 14 of 15 ACL rupture patients, the injured knee showed higher varus angle than the unharmed knee in the weight-bearing positions radiograph of the entire lower extremity; in one